

RECURRENT SEVERE VOMITING IN A 7-YEAR-OLD BOY

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ABSTRACT

This case study is a reminder that recurrent severe vomiting requires admission for correction of fluid and electrolyte derangement, and a diagnostic work-up. It also highlights the need for a high level of clinical suspicion and good history taking in the diagnosis of cyclical vomiting syndrome. A definitive diagnosis is important to prepare the patient and family for future management as cyclical vomiting syndrome is a chronic episodic condition.

Keywords: Cyclical Vomiting Syndrome; Paediatrics; Recurrent Vomiting;

SFP2017; 43(4): 40-43

INTRODUCTION

Recurrent vomiting can sometimes be a challenging situation. A case is reported of three such episodes. Detailed history taking was the key to the diagnosis.

PARENT'S REVELATION

Doctor, why does my son always vomit after our family holidays while remaining well in between our travels?

WHAT HAPPENED?

Presenting Complaints

A 7-year-old Chinese boy, L, presented to the Children's Emergency for a 4-day history of vomiting after returning from a family trip to Bangkok. Vomiting was initially 4–5 times throughout the day, increasing to 7–8 times on day 4 of illness, and would happen each time he took something by mouth. The increase in frequency triggered the ED visit and hospital admission. The vomitus comprised undigested food, was non-bilious, non-bloody, and was about 1 tablespoonful in volume each time. This was associated with significant lethargy and L needed to be carried around. L tolerated only spoonfuls of water. There was no abdominal pain, diarrhoea,

constipation, urinary symptoms or headache. He did not consume any street food on the trip and none of his family members on the same trip were ill.

This was L's third episode of vomiting. His first episode occurred 15 months earlier after he came back from Batam and the second episode 9 months prior, after he came back from Taiwan. During both episodes, L recovered after a week of hospitalisation and intravenous hydration. Diagnosis made was evolving gastroenteritis in the first episode, although there was no diarrhoea, and possible food allergy in the second episode.

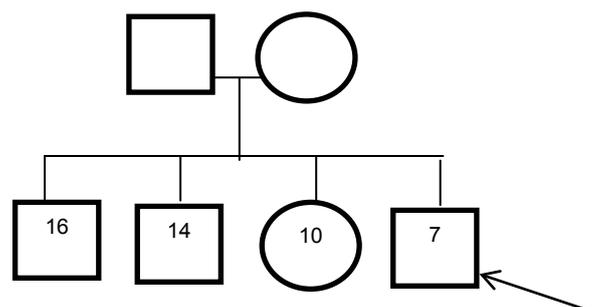
During this admission, L's mother was very concerned and expressed multiple times that L always had severe vomiting after travel, despite the family eating at restaurants and abstaining from street food. L was otherwise well in between episodes.

Past History/Paediatric History

L's past medical history included chronic constipation and fussy eating since the age of 3. He was developmentally normal with up-to-date vaccinations and was described by his parents as "active and playful". He had no history of recurrent headaches. His weight tracked along the 3rd centile and height along the 25th centile.

Social History — School and Habits

L attended Primary One at a mainstream school and had no



academic issues. He slept 9 hours a night and had screen time for about 5 hours per day, comprising television and tablet use, mainly for computer games. He did not suffer from motion sickness during car travel. His father was a businessman and his mother was an insurance agent. He was primarily cared for by a domestic helper.

Family History

L was the youngest of 4 children; his older siblings were aged 16, 14, and 10. His only significant family history was that his father suffered from migraine.

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Figure 1: Genogram

Physical Examination During This Admission

L had a low-grade fever of 38°C, was lethargic and moderately dehydrated as evidenced by tachycardia of 127/min and dry mucous membranes. He weighed 16 kg (he was previously 17.9kg) and there was no conjunctival pallor. His abdominal examination was normal and there was no organomegaly. His heart, lung, and neurological examinations were normal. Capillary glucose was 5.8 mmol/L (4.0–7.8 mmol/L). Blood investigations showed normal leukocyte counts of 6.75 x 10⁹/L (3.4–9.6 x 10⁹/L), haemoglobin of 12.3 g/dL (12.9–17.0 g/dL), platelet count of 257 x 10⁹/L (132–372 x 10⁹/L). A renal panel done showed hypernatraemia of 150 mmol/L (132–147 mmol/L) and elevated urea of 10.4 mmol/L (2.5–6.5 mmol/L). Potassium was 3.5 mmol/L (3.5–5.5 mmol/L), creatinine was 44µmol/L (33–70 µmol/L) and chloride was 110mmol/L (95–110 mmol/L). The abdominal X-ray was normal with no evidence of bowel obstruction. He was diagnosed with viral illness with vomiting and admitted to the general ward.

GAINING INSIGHT

At this point, this case triggered several issues:

1. What serious causes must be excluded in this case of episodic vomiting?
2. Is there a common factor for his 3 episodes of vomiting?

1. What Serious Causes Must be Excluded in This Case of Episodic Vomiting?

The following life-threatening and serious causes should be considered:

- a) Metabolic causes: inborn errors of metabolism such as fatty acid oxidation defects and mitochondrial disorders.^{1,2} Patients would have abnormalities in

between the episodes such as poor growth and developmental delay. Episodes of vomiting would be precipitated by fasting, or high-fat or high-protein meals.¹

- b) Anatomic causes: malrotation with intermittent volvulus and obstruction.^{1,2} These tend to present with bilious vomiting and severe abdominal pain.
- c) Renal causes: ureteropelvic obstruction causing hydronephrosis.^{2,3} Intermittent ureteropelvic junction obstruction has also been reported to cause abdominal pain, nausea and vomiting in a condition known as Dietl’s syndrome.⁴
- d) Neurological causes: occipital epilepsy.⁵

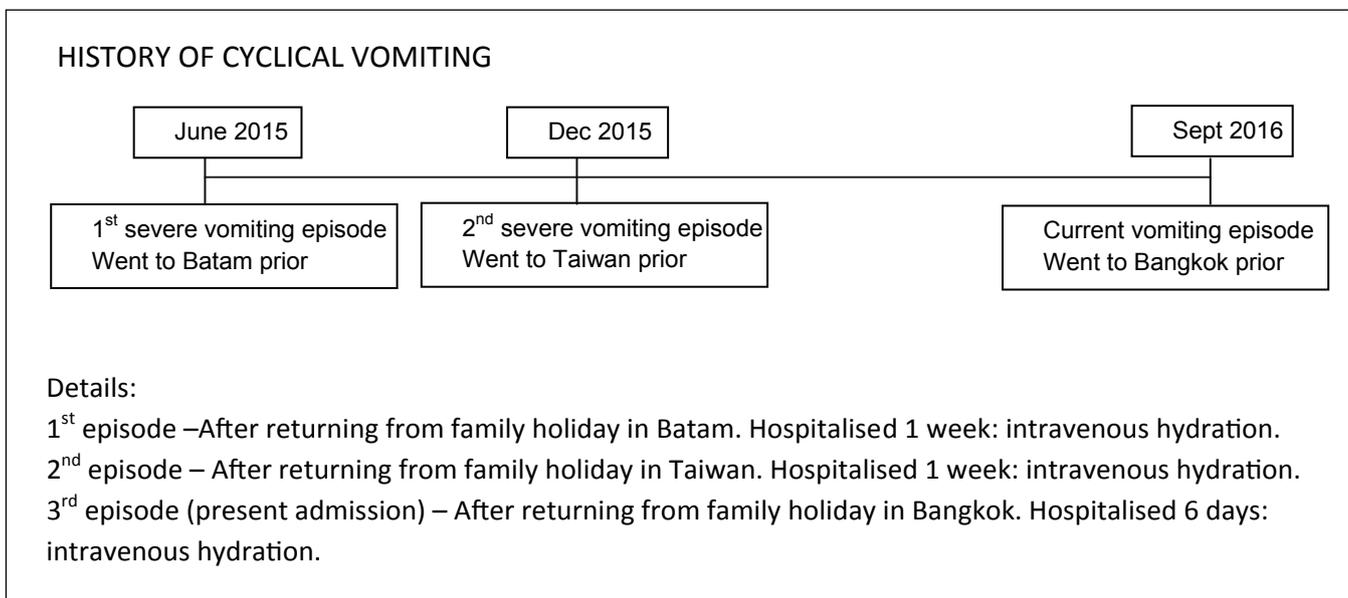
There could have been an infective trigger in this case. However, diabetic ketoacidosis is unlikely as there was no hyperglycaemia or acidosis.

2. Is There a Common Factor For His 3 Episodes of Vomiting?

While life-threatening conditions had been excluded, L’s mother’s question remained unanswered. There were 2 unique features of L’s vomiting. Firstly, L’s vomiting was recurrent, episodic, and he was well between episodes. Secondly, while he did have a history of travel, there was no diarrhoea to suggest acute gastroenteritis,⁶ which is the most common cause of vomiting.⁷ At this point, the team started to consider the possible diagnosis of cyclical vomiting.

The clinical features of L’s vomiting fit the description of cyclical vomiting syndrome (CVS): Vomiting episodes in CVS are stereotypic for the patient in intensity, time of onset, duration and symptomatology,^{8,9} and patients are symptom-free in between episodes.⁹ Vomiting often starts in the early morning¹⁰ and can last from hours to days.¹ It is commonly associated with listlessness and pallor² and patients

Figure 2: History of Cyclical Vomiting



commonly have a personal or family history of migraine, as in the case of L.^{1,3,9}

CVS is classified by the American Headache Society as an “episodic syndrome that may be associated with migraine” under the ICHD III beta classification.³ It most commonly affects children aged 5 to 7 years.^{1,3,9} The North American Society for Paediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) has the following diagnostic criteria:¹⁰

- At least 5 attacks in any interval, or a minimum of 3 attacks during a 6-month period;
- Episodic attacks of intense nausea and vomiting lasting 1 hour to 10 days and occurring at least 1 week apart;
- Stereotypical pattern and symptoms in the individual patient;
- Vomiting during attacks occurs at least 4 times/hour for at least 1 hour;
- Return to baseline health between episodes; and
- No attribution to another disorder.

MANAGEMENT

How Do We Apply These Insights into Our Clinical Practice?

L was diagnosed with CVS and managed supportively. He was started on a 3 percent rehydration drip and given intravenous ondansetron for the vomiting and per rectal diclofenac for pain relief as L developed colicky periumbilical abdominal pain on day 2 of admission.

Progress

L’s appetite slowly improved and he was able to take porridge on day 5 of admission. He was discharged after 6 days of inpatient stay at a weight of 18kg. At the outpatient clinic 2 weeks later, his weight was 19.5kg and he had an improved appetite. L’s parents were advised to keep a food diary to identify potential triggers for formulation of preventive strategies for subsequent management. They were also advised to ensure that L had sufficient rest and regular meals especially during family trips in future.

Advice on prevention

The literature describes several preventive strategies. Patients and their families should keep a vomiting diary documenting foods or events associated with vomiting episodes and then avoid these precipitants.¹⁰ Psychological interventions such as stress management have also been suggested as a coping strategy,² but presently there is limited literature on specific counselling techniques for patients with CVS.¹¹ The NASPGHAN consensus statement also recommends general migraine advice (e.g. good sleep hygiene, exercise, hydration, regular meals), given the association between CVS and migraine.¹⁰ Pharmacological prophylaxis can be considered in patients who

vomit more than once every 1–2 months. However, most evidence regarding treatment options are from retrospective studies and case reports.¹² The 2008 NASPGHAN consensus statement recommends cyproheptadine for children below 5 years and amitriptyline for children above 5 years.¹⁰ Newer studies have shown topiramate^{13,14} and riboflavin^{15,16} to be effective as prophylactic treatment. Antihistamines such as diphenhydramine can be used in the prodromal phase,⁹ and can be brought along when L travels.

Recovery

Three months later, L went on another holiday, this time with a more relaxed itinerary, with sufficient sleep and regular meals. He only vomited twice during the trip but was well when he came back to Singapore. It was his first trip in a long time where he did not have a severe vomiting attack.

DISCUSSION

What is new? This case illustrates the need for good history taking. Taking a complete history of each vomiting episode helped us to identify specific trigger factors, which then allowed us to give specific advice on reducing travel stress.

What is known? In patients with a cyclical pattern of vomiting, up to 88 percent of patients will eventually be diagnosed with CVS,² although CVS is still a diagnosis of exclusion.^{1,17,18} Most families are able to identify what precipitates vomiting attacks.¹⁹

Triggers for vomiting in CVS are varied. In a case series done by Fleisher,²⁰ heightened emotion from stress was the commonest trigger. Excitement from birthdays, holidays, and vacations was almost as common, followed by infections such as upper respiratory infections. In other studies, foods rich in amines, sleep deprivation, exercise, and menstruation were identified.^{2,9,21} A population study by Abu-Arafeh cited travel as the most common precipitating factor of CVS (21%, n=34).²² The pathogenesis of CVS is still unknown.^{9,10}

In L’s case, his trigger might have been travel or a particular aspect of travel, for example: irregular sleeping hours, insufficient sleep, irregular meals, or increased activity and excitement.

Recommendations for CVS treatment are based on limited evidence and consensus opinion.¹⁰ During an acute phase of vomiting, the aim is to abort the attack early with sumatriptan and ondansetron.^{10,21} Caring for the child in a dark quiet environment may also help in abortion of the episode.⁹ If nausea and vomiting do not resolve, NASPGHAN states that sedatives can be considered as sleep might aid in symptomatic relief.¹⁰ Patients usually respond rapidly to intravenous fluids during acute attacks.¹⁰

While some children might be cared for at home or in the outpatient setting, most would require admission for intravenous hydration.²¹ Thus, management of an acute attack

is somewhat limited in the primary care setting.

A literature search did not show any studies that follow up children with CVS into adulthood. Two case control studies^{23,24} have reported an increased prevalence of migraine, however both studies had a small sample size of less than 30 patients and did not state the mean age of their cases at follow-up.

Limitations? As the pathogenesis of CVS is not known, it is difficult to target pathophysiology of disease with drugs. The prevalence of CVS in Southeast Asian children is also not known, although it has been shown to be small in other studies: the prevalence in was 1.9 percent in a Turkish study²⁵ and 3.9 percent in a Scottish study.²²

CONCLUSIONS

This case study illustrates the presentation of CVS. The diagnosis lies in the detailed history taking of events surrounding the severe vomiting episodes. It can then be confirmed by the exclusion of acute surgical and medical conditions, and the response to expectant treatment. Early prophylactic treatment could reduce the vomiting frequency and morbidity of this condition.

Patient consent was obtained and documented in the electronic medical record (CPSS CDOCs) prior to the writing of this paper.

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